

Appl. No. 10/702,442
Amendment dated: April 10, 2006
Reply to OA of: December 8, 2005

REMARKS

This is in response to the Official Action of December 8, 2005. Applicants have amended the claims in order to more precisely define the scope of the present invention, taking into consideration that outstanding Official Action.

Applicants acknowledge with appreciation the courtesy of the interview extended the Applicants' representative by Examiner Chen, the Examiner in charge of this application. At the interview, the outstanding rejections and a proposed amendment were discussed. Specifically, Applicants' representative proposed amending claim 1 to recite that the bubbles ascend along the surface of the substrate, including the surface above the horizon of the liquid. The Examiner indicated that he believed this feature of the claim would be inherent, but agreed to consider the amendment more fully if submitted as part of a Request for Continued Examination.

Accordingly, Applicants submit herewith an Amendment to claim 1 as proposed during the interview in conjunction with a Request for Continued Examination. In light of this submission, Applicants respectfully request that the amendment to claim 1 be entered and considered.

As mentioned above, claim 1 has been amended to recite that the bubbles ascend along the surface of the substrate, including the surface above the horizon of the liquid. Support for this amendment may be found throughout the specification as originally filed, including, e.g., the paragraph bridging the bottom of page 7 and top of page 8. This portion of the specification states that the gas bubbles 22 ascend from the bottom portion to the upper portion of the coated surface of the wafers. As the upper portion of the wafers are located above the horizon of the liquid, this portion of the specification clearly discloses the bubbles ascending along the surface of the substrate, including the portion of the surface above the horizon of the liquid.

Applicants respectfully submit that all claims now pending in the instant application are in full compliance with the requirements of the 35 U.S.C. §112 and are clearly patentable over the references of record.

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The rejection of claims 1-3, 5 and 7-9 under 35 U.S.C. §103(a) as being unpatentable over Degendt et al. (US Pub. No. 2002/0011257) in view of Muraoka et al. (US Pat. No. 6,696,228) as evidenced by Kashiwase et al. (US Pat. No. 5,378,317) has been carefully considered but is most respectfully traversed in light of the amendments to the claims and the following comments.

Applicants wish to direct the Examiner's attention to the basic requirements of a prima facie case of obviousness as set forth in the MPEP § 2143. This section states that to establish a prima facie case of obviousness, three basic criteria first must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Section 2143.03 states that all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

The Official Action urges that Degendt discloses a method for treating a surface of a substrate wherein bubbles may work to strip a substance from the surface of the substrate. The Official Action further notes that Degendt discloses that the substrate may be completely immersed in the liquid or may be suspended above the liquid such that no part of the substrate is immersed in the liquid. The Official Action implicitly acknowledges that Degendt fails to disclose a method wherein the bottom portion of the substrate is immersed in the liquid but the top portion is not immersed in the liquid.

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However, the Official Action urges that it would have been obvious to one of ordinary skill in the art to partially immerse the substrate in the liquid as claimed in the instant invention because Degendt discloses that complete immersion and absolutely no immersion can both be used to remove resist and residues. Applicants respectfully traverse this statement.

In support of the position that it would have been obvious to use the two different methods disclosed in Degendt, the Official Action cites three cases, all of which support the proposition that it is obvious to use two compositions together when each is known to be separately useful for the same purpose. Applicants have reviewed each of the cases cited in the Official Action and note that the holding in each case is limited to instances where two compositions are mixed. That is to say, none of the cited cases address the case where two separate methods are combined and therefore clearly do not support the conclusion that it is obvious to combine two separate methods. Accordingly, the conclusion drawn by the Official Action that "the obviousness of applying two known process steps sequentially or simultaneously is clearly analogous to applying two known compositions" finds no support in the case law or in the Manual of Patent Examining Procedure. In light of this, Applicants respectfully reject the conclusion reached in the Official Action as having no legally binding effect and as failing to properly set forth a proper conclusion of obviousness.

Applicants respectfully assert that the courts have never drawn the conclusion reached by or made the analogy advanced by the Official Action because the conclusion and analogy are clearly erroneous. While mixing two compositions that have the same use is obvious because the two compositions will still be able to serve their purpose as part of a composition, the same is not true for combining two steps of a method. Often times, steps of a method must be performed in a certain order or at least separately or else the method as a whole will fail. If a first step is needed in order to prepare for performance of a second step, performing these steps out of order or at the same time will result in the second step failing because the first step was not

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performed in advance to prepare for the second step. Accordingly, Applicants respectfully traverse the conclusions set forth in the Official Action.

Applicants also note that the analogy set forth in the Official Action, i.e., that applying two known process steps sequentially or simultaneously is obvious because combining two known compositions is obvious, does not even apply to the case at hand. Degendt does not disclose two process steps, but rather discloses two wholly separate methods of stripping a residue from a substrate.

As clearly described in the specification, the first embodiment of the method disclosed in Degendt involves placing wafers above the solution interface but not immersing the substrate. The substrate is exposed to a moist ozone ambient and processed for a sufficient period of time (see paragraphs [0086]-[0089]).

Alternatively, Degendt discloses a second embodiment wherein the substrates are completely immersed in the liquid and bubbles contact the surface to strip residue from the surface (see paragraphs [0092]-[0093]). What Degendt does not disclose is using both of these methods sequentially or simultaneously. Throughout Degendt, the two different methods are separately discussed, and Degendt never discloses performing one method after the other. This is because Degendt discloses two different methods, not two different steps of a single method. Accordingly, even assuming that the analogy set forth in the Official Action were correct, the analogy would not apply to the Degendt reference because Degendt discloses distinct and separate methods, not individual steps.

In light of the above discussion, Applicants respectfully submit that a proper §103(a) rejection according to the guidelines set forth in MPEP §2143 has not been established because the Official Action has not provided a proper conclusion of obviousness. Accordingly, it is respectfully requested that this rejection be withdrawn.

As further support that the presently claimed invention is not obvious over the Degendt reference, Applicants submit herewith a Declaration under 37 CFR 1.132 that demonstrates greater than expected results.

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"A greater than expected result is an evidentiary factor pertinent to the legal conclusion of obviousness ... of the claims at issue." *In re Corkill*, 711 F.2d 1496, 226 USPQ 1005 (Fed. Cir. 1985). Evidence of a greater than expected result may be shown by demonstrating an effect which is greater than the sum of each of the effects taken separately (i.e., demonstrating "synergism"). *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989).

The enclosed Declaration is made by Ms. Chiou-Mei Chen who has a Masters degree in environmental engineering and is an employee of Industrial Technology Research Institute. The experiments conducted by Ms. Chen were all conducted by Ms. Chen alone or Ms. Chen and her associates together.

As can be seen from the results summarized in Table 1, under substantially similar experimental conditions, the stripping rate in angstroms/minute for the method as claimed in the present invention (i.e., partially immersed wafers) is more than 4 times the stripping rate of the wafers held above the water and more than 28 times the stripping rate of the wafers completely immersed in the liquid. The stripping rate of the method as claimed in the present invention is more than 3.5 times the stripping rate of the sum of the stripping rates of Group I and Group II

As can be seen from the results summarized in Table 2, under substantially similar experimental conditions, the stripping rate in angstroms/minute for the method as claimed in the present invention (i.e., partially immersed wafers) is almost 6 times the stripping rate of the wafers held above the water and more than 35 times the stripping rate of the wafers completely immersed in the liquid. The stripping rate of the method as claimed in the present invention is almost 5 times the stripping rate of the sum of the stripping rates of Group I and Group II

Thus, Table 1 and Table 2 clearly show that the presently claimed method demonstrates an effect that is much greater than the sum of each of the effects taken separately, and therefore demonstrates synergism. Moreover, these results are clearly greater than those which would have been expected from the prior art to an unobvious

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extent since the claimed method shows, at a minimum, a 3.5 fold increase over the sum of the results achieved by the prior art methods. There is no disclosure in the prior art that such a result should be expected from a combination of the two methods. Finally, Applicants respectfully submit that the results set forth in the Declaration are of a significant and practical advantage over the prior art, as the residue can be stripped from the substrates at a substantially faster rate, thereby increasing productivity and reducing production costs.

In light of the Declaration and the clear showing that the presently claimed method results in greater than expected results, Applicants respectfully submit that the presently claimed invention is not obvious over the prior art references cited in the outstanding Official Action. Accordingly, it is respectfully requested that this rejection be withdrawn.

Finally, Applicants note that all of the arrangements and elements recited in step a) of claim are necessary in order to create bubbles which ascend along the surface of the substrate, including the surface above the horizon of the liquid. Accordingly, the step of forming bubbles with a liquid and a gas on the surface of the substrate which comprises immersing a plurality of the substrates which are equidistantly arranged and are parallel to one another in the liquid contained in a bath such that only bottom portions of the substrates are immersed in the liquid, and introducing the gas to form the bubbles, must be disclosed or suggested in order to achieve the elements recited in step b) of claim 1. Absent a showing that the prior art references disclose all of the elements of step a) Applicants respectfully submit that the elements of step b) are also not shown. In light of the fact that the prior art references fail to disclose or suggest these features, Applicants respectfully request that the rejection be withdrawn.

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In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all of the claims now present in the application are most respectfully requested.

Respectfully submitted,

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